REMARKS

This Amendment is in response to the Office Action mailed on August 21, 2006. All objections and rejections are respectfully traversed.

Claims 1-30, 36 and 37-49 are currently pending.

Claim 49 is added to better claim the invention.

Request For Interview

The Applicant respectfully requests a telephonic interview with the Examiner and the Examiner's Supervisor, after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant may be reached at 617-951-3067.

Objection to Drawings

On the Office Action Summary, the Examiner checked the box for objection to drawings, however, there is not a reasoning for the objection. Applicant has attached a copy of the revised drawings filed with the Preliminary Amendment on July 25, 2001.

Objections to Specification

At page 2 of the Office Action, the Examiner objected to application incorporated by reference. Applicant has amended the specification to overcome the objection.

Claim Rejections - 35 USC § 112

At pages 2-4 of the Office Action, rejected claim 1 under 35 U.S.C. §112, first and second paragraph.

In particular, claim 1 was rejected under §112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner states that it does not appear that the inventor had possession of the invention upon filing because of the "WAFL then processes the messages in a somewhat arbitrary order" (Page 13, second paragraph) and "each message is initially provided by the initiator process with a logical translation block." (Page 13, third paragraph). The Examiner states that processing message in a somewhat arbitrary order as part of the overall swarm is certainly very different to providing each message with a logical transaction block.

Applicant respectfully disagrees with the Examiner. The "somewhat arbitrary order" means that it is not a purely arbitrary order in processing the messages. The messages of the swarm are initially tagged in any order with a transaction block. The first transaction block that the messages of the swarm are tagged with is "NEW." As the messages are processed the transaction block changes.

The transaction block denotes the state of message is, for example the transaction block state can be New, Loaded, Modified, or Load Retry. After all the messages are marked in an arbitrary order with a transaction block indicating New, the messages enter the load phase. Briefly, the term "LOAD" phase is used herein to describe the generalized process whereby meta-data and data relating to a given file on disk is retrieved by the file system for subsequent read and/or modification. In the load phase the message are processed in parallel in an arbitrary order by multiple processors and/or commingling steps of the load for each message. After the messages are loaded, the transaction block changes to Loaded. If the transaction is not loaded, then the transaction

block changes to load retry. After the blocks are loaded, they are modified in the order they are received minus the messages that are marked Load Retry. This is stated in further detail on page 14, line 3 to page 18, line 15.

In summary the massages are assigned a transaction block with "new" when first received in any order. Then, WAFL processes the new messages in a somewhat arbitrary order to Load the messages. Then during modify phase, they are processed in order received. The Load phase usually takes the most amount of time and processing messages in parallel without reference to order allows the load phase to be completed faster. Accordingly, Applicant had possession of the invention at the time of filing because of the disclosure in specification pages 14-18.

Additionally, Claim 1 is rejected under §112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject mater which Applicant regards as the invention. In particular, the Examiner states that the term "swarm of messages" in claim 11 is used by the claim to mean "a moving mass, crowd or throng," while the accepted meaning is "group of messages"

Applicant respectfully notes that "swarm of messages" is meant to be a group of messages. This is shown on page 5, lines 7-8 of the specification, which states "transferring a group of client transaction request entries each containing a separate client request entry from the NVRAM log to the file system as a swarm of messages with respect to the transaction request entries." The group of messages is transferred as a whole to a storage operating system.

Accordingly, claim 1 should be allowable over §112, second paragraph rejection as the term "swarm of messages" is using the standard definition of group of messages.

Claim Rejections - 35 USC §103

At pages 5-12 of the Office Action, claims 1-4, 8-24, 26-30, 36, 38-40, and 46-48 were rejected under 35 U.S.C. §103 as being unpatentable over Fuchs et al., US Patent No. 5,440,726, hereinafter Fuchs, in view of Karp et al., US Patent No. 5,588,117, hereinafter Karp, and further view of Jadav et al., US Patent No. 6,128,762, hereinafter Jadav.

The present invention, as set forth in representative claim 1, comprises in part:

> 1. A system for replay of a backup memory in a storage system having a file system for managing transfer of data to and from an attached disk array, the system comprising:
>
> a log in the backup memory containing the storage system transaction entries accumulated after a consistency point at which time results of the storage system transaction entries are committed to the disk array;
>
> an initiator process that establishes a swarm of messages with respect to the storage system transaction entries and delivers the swarm to the file system; and
>
> ***a parallel disk information-retrieval process in the file system that is carried out in an arbitrary order on the swarm of messages in parallel by a processor within the storage system, wherein the processor commingles steps of each message to process the messages in parallel.***

By way of background, Fuchs describes a computing system that concurrently executes a plurality of different application processes. *See* col. 5, line 66 through col. 6, line 4. The processes communicate with one another by passing messages. *See* col. 2, lines 38-42. Each application process is associated with a corresponding nonvolatile (backup) memory 44 containing logs of the process's incoming and outgoing messages. *See* col. 6, lines 12-15 and fig. 1. The nonvolatile memory also stores the process's "critical" program data, which is transferred to the memory at regular "checkpoint" time

intervals. *See* col. 3, lines 2-5. Furthermore, Fuchs system is an in seriatim system because it replays messages in series, one after the other. (Col. 18, lines 36-44) The in seriatim technique was recognized by the Applicant's as a prior art technique and described by the applicant in the Background of the invention on page 4, lines 3-10 on the application as filed.

Karp describes a communication protocol for group ordered message processing. A sending application groups messages together. The messages within the group are then processed in the order they are received. Additionally, the groups of messages are processed in the order sent.

Jadav describes a parallel system for different computers to access a common data storage system. In the system, data is stored by the different computers over a plurality of storage devices. The system uses logical locking to lock blocks while a write is being processed by one of the computers.

Applicant respectfully urges that Fuchs, Karp, and Jadav, taken alone or in any combination do not teach nor suggest Applicant's claimed novel ***a parallel disk information-retrieval process in the file system that is carried out in an arbitrary order on the swarm of messages in parallel by a processor within the storage system, wherein the processor commingles steps of each message to process the messages in parallel.*** In further detail, Applicant's invention uses either a single processor in the storage system to process the message in parallel by commingling steps of separate messages of the swarm of messages. In contrast, Jadav uses a plurality of processors to process requests. There

is no disclosure in Jadav, Fuchs, nor Karp, of commingling steps of each message to process the messages in parallel, as claimed by Applicant. Additionally, there is no disclosure of in Fuchs, Karp, or Jadav of processing the messages in an arbitrary order. Fuchs and Karp both disclose processing in the order received or sent.

Accordingly, Applicant respectfully urges that Fuchs, Karp, and Jadav, taken either singly or in combination, are legally precluded from rendering Applicant's claimed novel invention unpatentable under 35 U.S.C. 103 (a) because of the absence from the cited art of Applicant's claimed novel ***a parallel disk information-retrieval process in the file system that is carried out in an arbitrary order on the swarm of messages in parallel by a processor within the storage system, wherein the processor commingles steps of each message to process the messages in parallel.***

At paragraph 1 of the Office Action, claims 5 and 25 were rejected under 35 U.S.C. §103 as being unpatentable over Fuchs, Karp, and Jadav, and in further view of Park et al., US Patent Application Publication 2003/0131190, hereinafter Park.

At paragraph 2 of the Office Action, claims 6 and 7 were rejected under 35 U.S.C. §103 as being unpatentable over Fuchs, Karp, and Jadav, and in further view of Crighton, US Patent No. 6,330,570, hereinafter Crighton.

Applicant respectfully notes that claims 5-7 and 25 are dependent claims that depend from independent claims believed to be in condition for allowance. Accordingly, claims 5-7 and 25 are believed to be in condition for allowance.

Claim Rejections – 35 USC § 102

At page 14 of the Office Action, claims 41-45 were rejected under 35 U.S.C. §102 as being anticipated by Fuchs.

The present invention, as set forth in representative claim 41, comprises in part:

> 41. A file system, comprising:
> a backup memory storing a plurality of file system transaction entries;
> a first process that establishes a swarm of messages with respect to the file system transaction entries and delivers the swarm of messages to the file system;
> ***a second process that performs a parallel LOAD phase for a plurality of messages in the swarm of messages where the LOAD phase is processed by commingling one or more steps of the LOAD phase applied to each message of the swarm of messages***; and
> a third process that performs a MODIFY phase for at least some messages in the swarm of messages, the MODIFY phase operating on messages based on the order in which file system transaction entries were stored in the backup memory.

Applicant respectfully urges that Fuchs and Karp taken alone or in combination do not disclose Applicant's novel ***a second process that performs a parallel LOAD phase for a plurality of messages in the swarm of messages where the LOAD phase is processed by commingling one or more steps of the LOAD phase applied to each message of the swarm of messages***. In further detail. Applicant's claimed invention loads the swarm of messages in parallel by commingling the steps used in a load phase. For most messages, the order they are loaded does not matter, so the messages are loaded in a somewhat arbitrary order. If a message needs to be processed after a certain message,

the message is marked load retry. The messages are all loaded in a somewhat arbitrary order, then the messages that require modify are modified in the order received.

The Examiner states that Fuchs discloses a second process that performs a load phase in a concurrent manner for a plurality of messages in the swarm of messages. The Examiner states Fuchs discloses this at Col. 14, lines 11-32, which states:

> "When a previously failed node returns to service, the watchdog 15 in that node obtains a copy of the node list 32 and fault tolerant process list 25 from the watchdog 15 in another node. The fault tolerant process list 25, discussed above in conjunction with FIG. 4a, indicates which nodes are currently executing the application processes local to the previously failed node and the location of the state files containing the state of the local processes which are necessary to restart those processes. The watchdog 15 obtains copies of the files from the nodes currently executing the processes and restarts the processes using the state copies. As indicated above, when the watchdog 15 restarts a process, it sends a message to the other watchdogs 15 in the fault tolerant computing system 5, and if a watchdog 15 is running the restarted process, that watchdog 15 ceases running the process and modifies its fault tolerant process list 25 to indicate that the process is now running on the proper primary node. All of the other watchdogs 15 simply modify their fault tolerant process list 25, in the manner just indicated."

In reference to the statement above, Fuchs discloses a failed node receiving a list from a watchdog node. The watchdog node makes copies of applications being processed on other nodes and gives them to the failed node to be performed by the now primary node. The other nodes in Fuchs processing the applications of the list is not the same as Applicant's ***LOAD phase*** being ***processed by commingling one or more steps of the LOAD phase applied to each message of the swarm of messages***. Applicant's in-

vention commingles the different load steps of the messages to load in parallel. There is no disclosure in Fuchs of a processor commingling steps of messages to load in parallel.

Accordingly, Applicant respectfully urges that both Fuchs, and Karp, taken either singly or in combination, are legally precluded from rendering Applicant's claimed novel invention unpatentable under 35 U.S.C. 103 (a) because of the absence from both patents of Applicant's claimed novel ***a second process that performs a parallel LOAD phase for a plurality of messages in the swarm of messages where the LOAD phase is processed by commingling one or more steps of the LOAD phase applied to each message of the swarm of messages***.

All independent claims are believed to be in condition for allowance.

All dependent claims are dependent from independent claims which are believed to be in condition for allowance. Accordingly, all dependent claims are believed to be in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

Shannen C. Delaney
Reg. No. 51,605
CESARI AND MCKENNA, LLP
88 Black Falcon Avenue
Boston, MA 02210-2414
(617) 951-2500